REMARKS

Claims 1-24 are currently pending in the above-identified patent application. Claims 1, 9 and 17 have been amended to more clearly point out that the delta log is started when one of the storage units is taken off line, in accordance with the kind suggestion of the Examiner in the subject Office Action. No new matter has been added by these changes, since support therefor may be found on page 7, beginning on line 27, and ending on line 4 of page 8 of the present Specification, as originally filed, and from FIG. 3 thereof. The lines cited on pages 7 and 8 state: "Figure 3 illustrates an embodiment 300 of the present invention showing a method for using a delta log during temporary off line period of one of the data storage units in a redundant data storage system. The normal operational state of the system begins in block 302. When one of the data storage volumes is taken offline in block 304, simultaneously, a delta log is kept for all changes to the data in block 306. Service or other function is performed on the data storage volume in block 308. When the data storage volume is brought online in block 310, the writing to the delta log is stopped in block 312. The portions of data that were out of date are rebuilt using the delta log in block 314." (emphasis added by applicants).

In the Advisory Action, the Examiner stated that the added limitations: "starting a delta log concurrent with said step of removing one of said plurality of data storage units" and " during the period when one of said plurality of data storage units is removed" to claims 1, 9 and 17 are not supported by the current disclosure. In a telephone conference between the Examiner and applicants' attorney, Samuel M. Freund on July 27, 2006, applicants' attorney directed the Examiner's attention to the citation set forth hereinabove, and the Examiner withdrew the new matter rejection.

In the subject Office Action, claims 1-4, 6-12, 14-20, and 22-24 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rezaul et al. (U.S. Patent No. 6,282,670) in view of Burns et al. (U.S. Patent No. 6,088,694), since the Examiner stated that as per claim 1, Rezaul et al. discloses a method for recovering data in a redundant data storage system having a plurality of data storage units, said method comprising: storing said data on said plurality of data storage units according to a

redundant data storage method; removing one of said plurality of data storage units; while said one of said plurality of data storage units is removed, changing a portion of said data on the remainder of said plurality of data storage units; replacing said one of said plurality of data storage units; and updating said one of said plurality of data storage units.

The Examiner continued that Rezaul et al. does not specifically teach storing a record of said changes in a delta file and updating those portions of data recorded in said delta file as required by the claim, but that Burns et al. discloses storing a record of changes in a delta file and updating portions of data recorded in the delta file in order to achieve efficient and cost effective backup of data. The Examiner then concluded that since the technology for implementing a storage recovery system with storing a record of changes in a delta file and updating portions of data recorded in the delta file is well known as evidenced by Burns et al., an artisan would have been motivated to implement this feature in the system of Rezaul et al. in order to achieve efficient and cost effective backup of data, and therefore, it would have been obvious to one of ordinary skill in the art at the time of invention by applicants to modify the system of Rezaul et al. to include storing a record of changes in a delta file and updating portions of data recorded in the delta file because this would have achieved efficient and cost effective backup of data as taught by Burns et al.

As per claims 9 and 17, the Examiner incorporated the rationale in the rejection of claim 1.

The Examiner continued that Rezaul et al. further discloses a redundant data storage system capable of fast restoration of serviced data storage units comprising: a plurality of data storage units; and a controller that stores data on said plurality of data storage units according to a redundant data storage method, changes a portion of said data after taking one of said plurality of said data storage units off line, stores a record of the changes in a delta log that are made to the remainder of the plurality of said data storage units, brings said one of said plurality of said data storage units online, and updates said one of said plurality of said data storage units by updating those portions of data recorded in said delta file.

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Applicants respectfully disagree with the Examiner's rejection of independent claims 1, 9 and 17 for the reasons to be set forth hereinbelow.

The Examiner also rejected dependent claims 2 - 4, 6 - 8, 10 - 12, 14 - 16, 18 - 20, and 22 - 24 under 35 U.S.C. 103(a) as being unpatentable over Rezaul et al. in view of Burns et al. Since these claims depend from independent claims 1, 9 and 17, and applicants believe that these claims are patentable over Rezaul et al. in combination with Burns et al. for the reasons to be set forth hereinbelow, applicants believe further that the dependent claims are patentable.

Claims 5, 13, and 21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rezaul Islam et al. in view of Burns et al. as applied to claims 1, 9, and 17 respectively, and further in view of McCabe et al. (U.S. Patent Application Publication No. 2002/0016827). Since, as will be set forth hereinbelow, applicants believe that the Examiner has improperly combined Rezaul et al. with Burns et al., applicants respectfully believe that the Examiner has improperly rejected claims 5, 13, and 21 under 35 U.S.C. 103(a) by further combining these references with McCabe et al.

The Examiner made Lu (U.S. Patent No. 6,952,794) and Gold et al. (U.S. Patent No. 6,785,786) of record as pertinent to applicants' disclosure, but did not apply these references to the subject claims. As a result, applicants believe that no further response is required.

Turning now to the rejection of claims 1-4, 6-12, 14-20, and 22-24 under 35 U.S.C. 103(a) as being unpatentable over Rezaul et al. (U.S. Patent No. 6,282,670) in view of Burns et al. (U.S. Patent No. 6,088,694), applicants wish to direct the Examiner's attention to page 7, beginning on line 27, to page 8, line 16, of the present Specification, as originally filed, wherein it is stated that: "Figure 3 illustrates an embodiment 300 of the present invention showing a method for using a delta log during temporary offline period of one of the data storage units in a redundant data storage system. The normal operational state of the system begins in block 302. When one of the data storage volumes is taken offline in block 304, simultaneously, a delta log is kept for all changes to the data in block 306. Service or other function is performed on the data storage volume in block 308. When the data storage

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volume is brought online in block **310**, the writing the delta log is stopped in block **312**. The portions of data that were out of date are rebuilt using the delta log in block **314**. The embodiment **300** may be used with data storage volumes that are temporarily offline. The offline action may included operator initiated actions, such as service, or may be unscheduled actions such as power failure or other action. During the period of offline activity, the data storage volume may retain all of the existing data. Thus, when the data storage volume is returned to service in block **310**, only the changed data would require updating. The embodiments illustrate how a data storage volume in any type of redundant storage system may be simply and quickly rebuilt and returned to full service when the data on the data storage volume is unchanged during the out of service period. By storing a delta log of the changes made during the unavailable period, the out-of-service volume may be quickly brought back to a full operating state without the lengthy and cumbersome process of rebuilding all of the data."

Independent claims **1**, **9** and **17**, as amended, recite the feature that the delta log is started when one of the storage units is taken off line.

The lines quoted by the Examiner as describing the teachings of Rezaul et al. (Col. 4, lines 33-42) state: "Briefly, the invention relates to managing defective media in a RAID system having redundancy for use with removable and identifiable storage devices that can be attached to the RAID system at a plurality of different points. The system has means for identifying a failed storage device and removing the failed storage device from the RAID system, and means for reconstructing data stored on the failed storage device, for recording on a replacement device, from data and redundant data stored on remaining ones of the identifiable storage devices." In lines 42-57 of Rezaul et al., it is stated: "The system detects storage areas of the remaining ones of the identifiable storage devices that contain media defects, and records in non-volatile storage, identification of areas of the identifiable storage devices that contain media defects. The system continues reconstructing the data stored on the failed storage device, for recording on the replacement device, from data and redundant data stored on remaining ones of the identifiable storage devices. The RAID system of the invention records the identification of

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areas of the identifiable storage devices that contain media defects in a non-volatile random access memory on an adapter circuit card of the RAID system. In this way, although a logical stripe of data is lost, other data on the logical device continues to be reconstructed and the user need not replace lost data on an entire logical device." (emphasis added by applicants).

By contrast, Col. 4, lines 32-59 of Burns et al. state that: "The present invention provides a computer system that permits continuous availability of a file that is stored in a file management system and linked or referenced by a database management system (DBMS) through a DATALINK data type, even while the file is being modified at the file management system with either the append or update operation. Applications gain access to a linked file name through the DBMS, access file data through local file systems, and make modification to that data. During the modification, other applications or users can access the immediately previous version of the file which is registered in the DBMS. When a modifying application finishes writing file data on the local file system, it closes its write access and transactionally updates the Datalink reference to the linked file, to reference the change file data. In accordance with the invention, the file management system provides a 'check-out' function that manages concurrent operations, such that the original file remains linked to the database system while the copy is being updated and remains available to other users while the original file is checked out. The file-management system also includes a 'check in' function that receives the updated file, saves the updated file under a new name different from the original, generates new metadata for the updated file, and transactionally updates the file with its new metadata. In a DBMS, check-in causes an SQL update operation on the Datalink-referenced file."

Further, Col. 5, lines 25-40 of Burns et al. states: "The invention can be applied to the operation of updating a linked file A1, which was described above. In accordance with the invention, the procedure could be changed as follows: (a) make a copy of file A1 using the filesystem services. Let the copy of the file be called A2. (b) Modify A2. Note that file A1 remains linked while the user modifies A2 and is available for the DBMS queries. (c) Make a new metadata based on the

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content of A2. (d) Update the row which referenced file A1 in the database with the metadata and reference A2. The update processing in the DBMS involves the following. File A1 is 'unlinked' and A2 is 'linked' as part of the same transaction. (emphasis added by applicants).

Additionally, in Col. 5, line 61 to Col. 6, line 5 of Burns et al., as identified by the Examiner, it is stated: "The efficient backup involves that only the modified portions of a 'versioned' file be backed up. In our example above, the reference file A1 is referred to as a 'versioned' file. Assume file A1 is backed up in total. However, the backup operation of the new version of file A2 would involve backing up only the modified portions with respect to A1. The file changes from a prior version define what is called a delta file. This delta file compactly represents A2 as a set of changes with respect to A1. By backing up this delta file instead of backing up the whole file A2, a computer system may reduce the cost of backup for frequently versioned data and files." (emphasis added by applicants).

Clearly, Burns et al. requires that A1 remain linked while the user modifies A2, A1 being available for the DBMS queries. Rezaul et al., by contrast, requires that the system has means for identifying a failed storage device and for removing the failed storage device from the RAID system. As stated hereinabove, subject independent claims 1, 9 and 17 also require this feature.

Applicants fail to understand the Examiner's conclusory statement that since the technology for implementing a storage recovery system with storing a record of changes in a delta file and updating portions of data recorded in the delta file is well known as evidenced by Burns et al., an artisan would have been motivated to implement this feature in the system of Rezaul et al. in order to achieve efficient and cost effective backup of data. Clearly, Rezaul et al. does not require or teach this additional feature to achieve its goal of managing defective media in a RAID system.

The Federal Circuit ruled in *In re Kahn* (Fed.Cir. No. 04-1616, March 22, 2006), that a Board of Patent Appeals and Interferences must articulate the motivation, suggestion or teaching that would have led the skilled artisan at the time of the invention to combine prior art elements to make the claimed invention. To

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establish a *prima facie* case of obviousness based on a combination of prior art elements, "the Board must articulate the basis on which it concludes that it would have been obvious to make the claimed invention, ... When the Board does not explain the motivation, or the suggestion or teaching, that would have led the skilled artisan at the time of the invention to the claimed invention as a whole, we infer that the Board used hindsight to conclude that the invention was obvious." The Examiner has merely stated that since the technology for implementing a storage recovery system with storing a record of changes in a delta file and updating portions of data recorded in the delta file is well known as evidenced by Burns et al., an artisan would have been motivated to implement this feature in the system of Rezaul et al. In order to achieve efficient and cost effective backup of data, and therefore, it would have been obvious to one of ordinary skill in the art at the time of invention by applicants to modify the system of Rezaul et al. to include storing a record of changes in a delta file and updating portions of data recorded in the delta file because this would have achieved efficient and cost effective backup of data as taught by Burns et al.

Applicants respectfully believe that this bare statement by the Examiner does not rise to a motivation, suggestion or teaching as required by the court in *In re Kahn*. Rather, applicants believe that the Examiner is using hindsight to construct the present claimed invention.

Additionally, Burns et al. teaches backing up the delta file instead of backing up the entire file A2, which clearly teaches away from the system of Rezaul et al. which requires means for reconstructing data stored on the failed storage device, for recording on a replacement device, from data and redundant data stored on remaining ones of the identifiable storage devices.

Burns et al. also teaches away from the present claimed invention, for example, by not requiring that the failed storage unit be removed from the system. Further, as stated by the Examiner, Rezaul et al. does not teach storing a record of said changes in a delta file and updating those portions of data recorded in said delta file as required by the subject claims.

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Applicants therefore respectfully believe that the Examiner has failed to make a proper *prima facie* argument for obviousness as is required in a rejection under 35 U.S.C. 103(a), since: (a) there would be no motivation to combine Rezaul et al. with Burns et al.; and (b) Rezaul et al. teaches away from Burns et al.

In view of the discussion presented hereinabove, applicants believe that subject claims 1-24, as amended, are in condition for allowance or appeal, the former action by the Examiner at an early being earnestly solicited.

Reexamination and reconsideration are respectfully requested.

Respectfully submitted,

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Date: August 21, 2006   By:
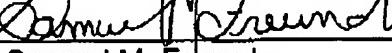
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